

EXHIBIT E

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**U.S. District Court
DISTRICT OF KANSAS (Kansas City)
CIVIL DOCKET FOR CASE #: 2:01-cv-02409-CM**

Evolution Inc v. Suntrust Bank, et al
Assigned to: Judge Carlos Murguia
Demand: \$0
Case in other court: 10CCA, 04-03495
10CCA, 04-03495
Cause: 17:501 Copyright Infringement

Date Filed: 08/15/2001
Date Terminated: 11/05/2004
Jury Demand: Both
Nature of Suit: 820 Copyright
Jurisdiction: Federal Question

Special Master

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		Defendants Premium Assignment Corporation, Suntrust Bank, The (Attachments: # 1 Exhibit 1 (Expert Report of Robert J. Sherwood)# 2 Exhibit 2A (Part 1 - Deposition Robert J. Sherwood)# 3 Exhibit 2B (Part 2 of 2 - Deposition Robert J. Sherwood)# 4 Exhibit 3 (Expert Report and Disclosure of Bruce E. Webster))(Jones, Russell) Title Modified on 5/4/2004 (ck). (Entered: 05/03/2004)
05/03/2004	163	MOTION to Exclude Expert Report and Testimony of Donald J. Reifer by Defendants Premium Assignment Corporation, The Suntrust Bank (Jones, Russell) Modified on 5/4/2004 (ck). (Entered: 05/03/2004)
05/03/2004	164	MEMORANDUM in support of 163 Motion to Exclude Expert Report and Testimony of Donald J. Reifer by defendants' (Attachments: # 1 Exhibit 1 (Expert Report of Donald J. Reifer)# 2 Exhibit 2A (Part 1 of 3 - Deposition Donald J. Reifer)# 3 Exhibit 2B (Part 2 of 3 - Deposition Donald J. Reifer)# 4 Exhibit 2C (Part 3 of 3 - Deposition of Donald J. Reifer)# 5 Exhibit 3 (Expert Report and Disclosure of Bruce F. Webster))(Jones, Russell) Modified on 5/4/2004 (ck). (Entered: 05/03/2004)
05/05/2004	165	MOTION to Continue Trial by Plaintiff Evolution Inc (Kinzer, Lance) (Entered: 05/05/2004)
05/05/2004	166	MEMORANDUM IN SUPPORT of 165 MOTION to Continue Trial by Plaintiff Evolution Inc (Attachments: # 1 Exhibit 1- Ltr dated 3-5-04# 2 Exhibit A - Applications used to extract data# 3 Exhibit B-Current Loan# 4 Exhibit Invoices Missing# 5 Exhibit D-Email communication# 6 Exhibit E- Evaluation of New PF32# 7 Exhibit F - Corrected in New PF32 & G - Evaluation of New PF32# 8 Exhibit H-Part 1 List of Non-Blank Files# 9 Exhibit H-Part 2 - List of Non-Blank Files# 10 Exhibit H-Part 3 List of Non-Blank Files# 11 Exhibit H-Part 4-List of Non-Blank Files# 12 Exhibit H-Part 5-List of Non-Blank Files# 13 Exhibit I - File Names)(Kinzer, Lance) (Entered: 05/05/2004)
05/06/2004	167	Minute Entry for proceedings held before Judge David J. Waxse : Status Conference regarding Special Master issues held on 5/6/2004. (See Minute Sheet for deadlines.)(jm) (Entered: 05/06/2004)
05/10/2004	168	MEMORANDUM in Opposition by Defendants Premium Assignment Corporation, Suntrust Bank, The re 160 MOTION Re-designate 232 Computer Files from Restricted Confidential to Confidential, 165 MOTION to Continue Trial <i>DEFENDANTS' CONSOLIDATED MEMORANDUM OF LAW OPPOSING PLAINTIFF'S MOTION FOR REDESIGNATION OF CERTAIN RESTRICTED CONFIDENTIAL FILES AND MOTION FOR CONTINUANCE OF TRIAL SETTING</i> (Jones, Russell) (Entered: 05/10/2004)
05/10/2004	169	AFFIDAVIT of Bryan G. Harrison re 168 Memorandum in Opposition to Motion, by Premium Assignment Corporation, Suntrust Bank, The. (Attachments: # 1 Exhibit 1)(Jones, Russell) (Entered: 05/10/2004)
05/11/2004	170	DISREGARD THIS DOCUMENT: INCORRECT .PDF DOCUMENT ATTACHED. SEE CORRECTED DOCUMENT 171 ; Memorandum of Law regarding Impropriety of Copying Third Party Software by Defendants Premium Assignment Corporation, Suntrust Bank, The. (Attachments: # 1

EXPERT REPORT OF DONALD J. REIFER

26 June 2003

Prepared for:

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Prepared by:

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Expert Report of Donald J. Reifer

1. **OBJECTIVES**

I was retained by Evolution, Inc. on 11 November 2002, to examine and value claims made relative to an alleged unauthorized use of software licenses by the defendant, Sun Trust Bank. Evolution is a small business located in the Kansas City metropolitan area that specializes in producing billing software for the insurance industry. They market the following software products in this field that run under the Windows operating system. They license these products to third-parties: Accounts.Net™, Agents Tool Box™, Chameleon™, Compete™, Data Door™, Easy Forms Generator™, PF2000 Lite™, PF2000™, PF32™ and VCS™.

I was instructed to value the following four items:

- (1) The unauthorized use by Sun Trust Bank of Evolution's PF32™ licensed software for generating reports in their MIDAS software;
- (2) The unauthorized use by Sun Trust Bank of Evolution's licensed software when it created Data Dictionary Files (DDF) to be used as it converted to the use of Hudson Valley Data Services loan software and used with PACFAC;
- (3) The unauthorized use by Sun Trust Bank of Evolution's licensed Data Door™ product to create a derivative work; and
- (4) Those opportunity costs forgone due to plaintiff's focus on recovering damages.

The results of my effort will form establish a fair value for Sun Trust Bank's alleged violation of Evolution's license agreements.

2. **SUMMARY OF OPINIONS**

After due consideration of the available information, and based on the analysis that I performed, fully explained herein, I believe Sun Trust Bank's alleged unauthorized use of Evolution's licensed software products should be valued at **\$4,001,627**.

3. **QUALIFICATIONS AND COMPENSATION**

During my more than 30 years in the software field, I have programmed, been a team leader, managed complex software development efforts, managed contracted software efforts, served as a software management consultant, served as a senior executive official with the Department of Defense (DOD), and built a software business. I am considered one of the technical leaders in the field of software engineering and management. My expertise relates to the development and management of complex software products and projects. My focus during my career has been on managing software by the numbers. Using metrics data collected from on-going projects, I have been able to ascertain their true status, assess their progress and develop action plans to help bring their software projects in on schedule and within budget constraints.

From 1993 to 1995, I managed the DoD Software Initiatives Office under an Inter-governmental Personnel Act (IPA) appointment with the Defense Information Systems Agency (DISA). I managed over 50 contracts/grants as part of this effort and served as source selection authority for many of them. While with TRW, I served as Deputy Program Manager for their Global Positioning Satellite software efforts. This assignment involved developing plans and estimates for the effort and managing the on-time and budget development of large and complex software products. While with the Aerospace Corporation, I managed all of the software efforts related to the Space Transportation System (Space Shuttle).

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Currently, as President of my own consulting firm, Reifer Consultants, Inc., I advise executives in government and Fortune 500 firms in the areas of software improvement strategies. This consulting involves formulating productivity and quality improvement strategies, estimating their costs and benefits, and developing business cases that are used to justify expenditures.

I have published over one hundred technical papers and five books. My IEEE Computer Society "Tutorial on Software Management" is in its 6th Edition and is one of the best selling such texts in the field. As a leader in the field, I am asked to keynote technical conferences and symposia on software engineering and management topics of interest worldwide.

My awards include the Secretary of Defense's Medal for Outstanding Public Service, the AIAA Software Engineering award for contributions to the aerospace industry, the prestigious Frieman Award for contributions to the field of software cost estimating, the DISA and the Defense Mapping Agency Recognition awards for my work while in government, membership in Who's Who in the West, and the Hughes Aircraft Company Fellowship.

I have considerable expertise in the fields of software cost estimating and productivity improvement. As part of my management consulting business, I lecture on, consult and teach the topics of software cost estimating and business case formulation worldwide. My clients have included Boeing, Fidelity Investments, Hughes Network Systems, Lockheed, Lucent, Motorola, Nokia and Westinghouse. I am a visiting associate at the Center for Software Engineering at the University of Southern California (USC/CSE) where I am a member of the COCOMO II project team. COCOMO II is the world's most used software cost estimating model. In 2000, I co-authored a book with Dr. Barry Boehm and other members of the USC/CSE team entitled "Software Estimating with COCOMO II" and in 2001 published my newest book entitled "Making the Software Business Case: Improvement by the Numbers." From 1985 to 1993, I developed and marketed the SoftCost family of software estimating models worldwide. These estimating models were used by more than twenty organizations, including government (Army, Navy, etc.) and commercial firms (MITRE, Rockwell, Texas Instruments, etc.), to develop software cost and schedule estimates.

I have prepared independent software effort and duration estimates for use by the government and industry. These have been used as benchmarks against which competitive bids have been compared and their reasonableness ascertained. Some of my clients for these services include Magnavox, NASA (Space Station), Northrop Grumman, the U.S. Navy and Westinghouse.

I was retained by the plaintiff to develop independent estimates for the case of the State of Arizona versus TRW on a civil litigation. I was also retained by Tradescape.com to serve as an expert witness on software cost and productivity issues in a software piracy case. These two cases were settled out of court. As a result, I was never deposed or brought before the court as an expert witness.

Further details of my education, work experience and publications are summarized in my resume attached hereto as Exhibit A.

My billing rate is \$500 per hour for my services.

Expert Report of Donald J. Reifer

4. MATERIALS**4.1 MATERIALS PROVIDED BY THE PLAINTIFF**

The following materials were provided to me by Evolution either during an on-site fact-finding visit or subsequently:

1. Background information on Evolution's software products and services.
2. Background information on Evolution's clients and market plans.
3. Background information on Sun Trust Bank's alleged unauthorized use of Evolution's licensed products.
4. Nominal billing rates and license fees for Evolution's products and services. These were provided by Evolution from their records of past transactions.
5. Source code line counts for the MIDAS program. These size estimates were developed by Evolution using guidance that I provided that was compatible with the counting conventions endorsed by the Software Engineering Institute.
6. Answers and objections to defendant Premium Assignment Corporation's first interrogatories to Plaintiff, Case No. 01-2409-CM, 17 April 2003.
7. Detailed information on the innovations made by Evolution in their Data Doors product and its related DDF.

In addition, numerous telephone queries were made to clarify the information supplied that forms the basis of this report. Answers to some of these questions were provided verbally.

4.2 OTHER MATERIALS USED IN FORMING MY OPINIONS

As part of this effort, I researched the literature to identify relevant facts and precedence for this valuation exercise. The results of my literature search are provided in my references section. Key terminology used in this report is defined in Appendix B.

As an experienced software cost estimator, I used the COCOMO II software cost estimation model to generate the independent cost estimates that I used for valuation purposes. The model is a set of mathematical formulas used for estimating software development project effort and duration. The model is currently calibrated to reflect cost and schedule data collected from 161 completed software projects. Software that can be used to develop estimates using the COCOMO II model can be downloaded for free from the Center for Software Engineering's web site at the University of Southern California (USC) located at <http://sunset.usc.edu>. I explain the COCOMO II mathematical formulas and how they were used for valuation within this report in section 6. The version of the model used for valuation purposes was COCOMO II.2000.

5. CORE OPINIONS AND VALUATIONS

Set forth below in Section 5.1 are my core opinions relating to my independent valuation of Sun Trust Bank's supposed unauthorized use of Evolution's licensed products. Thereafter, in section 6 of my report, I provide a detailed analysis of the many COCOMO II model runs that I performed which support my opinions and conclusions.

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5.1 CORE OPINIONS

Based on the information supplied, the following are our core opinions:

- a. Evolution's claims that Sun Trust Bank violated its license agreement for PF32™ software product seem valid. In MIDAS, large sections of the PF32™ code appear verbatim without modifications and alterations. Such supposed use seems to have enabled Sun Trust Bank to avoid paying Evolution to design, develop, test and deploy ledger card service screens as they supposedly generated a *derivative work* of the product. In addition, Sun Trust Bank supposedly took measures to avoid paying license fees for users of Evolution's products. In my opinion, such added license fees seem rightful and due Evolution as part of this valuation.
- b. Evolution's claims that Sun Trust Bank violated its license agreement by creating Data Dictionary Files to be used as it converted to the use of Hudson Valley Data Systems loan software seems valid. Such supposed use of Evolution Data Dictionary Files enabled Sun Trust Bank to make the transition to the use of other software quickly and efficiently. Sun Trust Bank's option was to perform the database conversion manually, a very costly venture.
- c. Evolution's claims that Sun Trust Bank violated its license agreement by modifying their Data Door™ product's file structure so that data defined by its Data Dictionary Files (DDF) could be interfaced with Sun Bank Trust's Microsoft Access database seems valid. Sun Trust Bank supposedly used Evolution's file and data definitions to build a *derivative work*, e.g., an interface to a Microsoft Access database. They then supposedly illegally built software products that used this interface mechanism to process loan data. Sun Trust Bank's options were either to hire Evolution to (1) build the software products or (2) modify the file and data structures that were defined by Evolution's DDF so that the software that Sun Trust Bank built could run with a Microsoft Access database.
- d. Evolution's claims that it had to forego numerous lucrative business opportunities in order to prosecute Sun Trust Bank for suspected license agreement violations. Such opportunity costs seem valid and are treated as opportunity costs in this valuation engagement.

5.2 VALUATION

The value assigned to Sun Trust Bank's unauthorized use of Evolution, Inc.'s products primarily to develop derivative products and avoid paying license fees rightfully due was determined using the six-step approach which are summarized as follows and detailed in Table 1.

1. Fact-Finding
2. Valuation of unauthorized use of PF32™ software
3. Valuation of unauthorized use of Data Dictionary Files
4. Valuation of unauthorized use of Data Door™
5. Valuation of opportunity costs
6. Total valuation

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Step	Name	Goal	Approach
1	Fact-Finding	Gather pertinent information	On-site meeting with follow-up telephone queries
2	Valuation of unauthorized use of PF32™ software	Value income lost by plaintiff and profit gained by defendant	Legal permissibility – estimate how much income was lost by Evolution and how much Sun Trust Bank profited by violating the license agreement
3	Valuation of unauthorized use of Data Dictionary Files	Value income lost by plaintiff and profit gained by defendant	Legal permissibility – estimate how much income was lost by Evolution and how much profit was gained by Sun Trust Bank
4	Valuation of unauthorized use of Data Door™	Value derivative work	Legal permissibility – estimate how much would it have cost Sun Trust Bank to hire Evolution to develop the derivative work
5	Valuation of opportunity costs	Value lost business opportunities	Maximum profitability – estimate the scenario that would result in the greatest profit for Evolution assessing real options available
6	Total valuation	Calculate total value	Sum the parts – compute the initial results by summing the valuations that are the products of steps 2 to 6

Table 1: Seven-Step Valuation Approach

Step	Item Valued	Amount (\$)
2	Unauthorized use of PF32™ software	445,682
3	Unauthorized use of Data Dictionary Files	2,032,822
4	Unauthorized use of Data Door™	252,635
5	Opportunity costs	1,270,488
TOTAL VALUATION (in today's dollars)		\$4,001,627

Table 2: Total Valuation of Unauthorized Use of Evolution's Products

5.2.1 ASSUMPTIONS, CONTINGENT AND LIMITING CONDITIONS

For each of the individual four validations noted in Table 2, I have identified the following factors in the subparagraphs that follow: the item to be valued, the standard of value used, the highest and best use basis assumed, the assumed useful life (to take obsolescence into account in the valuation), the valuation method used and the valuation results.

Each of the valuations that follow is subject to the following assumptions, contingent and limiting conditions:

- The valuation was based on the information supplied by Evolution. None of the information was audited. It was, however, checked for reasonableness.
- The valuation assumes that all information supplied by Evolution was current and accurate.

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- Estimates of value made by us are based on information current as of the date of valuation and are subject to change.
- The valuation expert personally conducted this analysis and had no present or prospective interest in the items that are being valued.
- The current cost of money is assumed to be 5 percent (current Prime Rate + 0.75). The Prime Rate is the interest rate charged by banks to their most creditworthy customers.
- The minimum attractive Rate of Return for Evolution assumed is 3 percent. This Rate of Return is the most money that could be earned risk free by investing the money in question in an insured banking institution.

The valuation was determined by estimating what I believed were best and reasonable costs. No effort was made to assess penalties that the court may assess in addition to these costs should they be deemed applicable.

5.2.2 UNAUTHORIZED USE OF PF32™ SOFTWARE

- Item to Be Valued:** The unauthorized use of 9,962 source lines of code of PF32™ Visual Basic code by Sun Trust Bank to create ledger card service screens in MIDAS software. This valuation does not account for the value of Trade Secret use.
- Standard of Value:** fair value
- Highest and Best Use Basis:** legal permissibility (lawful use)
- Estimated Useful Life:** one year (assumes obsolescence occurs at the end of this period). Typical useful life guidance provided by the Internal Revenue Service (IRS) for valuing software items for tax purposes.
- Valuation Method:** income; the sum of the profits gained by the defendant and the service income lost by the plaintiff.
- Valuation Results:** $\$188,072 + \$257,610 = \$445,682$.

Profit Generated

- Unauthorized use of the PF32™ software source code represented a profit for Sun Trust Bank because it eliminated its need to develop its own software. To estimate the profit Sun Trust Bank accrued through the unauthorized use of PF32™ software, I used the popular COCOMO II cost estimating model calibrated jointly with Evolution's assistance. As discussed in Section 6.1, I ran this model to develop a \$193,709 or \$19.425 per source line estimate for developing replacement software (i.e., this cost per source line metric seems reasonable based on industry benchmarks). As Evolution would probably have been paid for its efforts when the software was delivered, we must discount the principal assuming a 3 percent minimum attractive Rate of Return for the money. The resulting profit that Sun Trust Bank accrued through the unauthorized use of Evolution's software is estimated to be \$188,072 ($\$193,709 \times 0.9709$).

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Lost Income:

- In addition, to make the conversion, Sun Trust Bank would have had to license the PF32™ software for an additional year as they developed their replacement software product. This maintenance fee represents service income of \$257,610 lost by Evolution as Sun Trust Bank transitioned to a new vendor. This income was calculated based on 109 actual users of the software, not the 44 that Sun Trust Bank was currently paying for, using the following fee schedule supplied to us by Evolution: increase in fee for 109 actual users of \$194,160 plus a one year update license for the software of \$63,450. The total service income lost by the plaintiff is therefore estimated to be \$257,610.
- The maintenance fee would be due at the start of the license year. Therefore, the amount is not discounted to take the cost of money into account.

5.2.3 UNAUTHORIZED USE OF DATA DICTIONARY FILES AND UTILITY SOFTWARE

- Item to Be Valued:** The unauthorized use of Data Dictionary Files including PACFAC by Sun Trust Bank to convert data from Evolution's proprietary file structures for use with Hudson Valley Data Systems software.
- Standard of Value:** fair value
- Highest and Best Use Basis:** legal permissibility (lawful use)
- Estimated Useful Life:** one time cost
- Valuation Method:** income; the sum of the income lost in license fees by the plaintiff and the profits gained by the defendant.
- Valuation Results:** \$2,032,822

Lost Income

- To perform the conversion legally, Sun Trust Bank would have had to license the software for an additional year as the conversion was made. They would have done this because they would have had to run both billing systems in parallel with one another until the conversion was completed. This additional maintenance fee of \$257,610 has already been accounted for in the PF32™ valuation.

Profit Generated

- To compute the profit generated, I looked at the options available to Sun Trust Bank. One feasible legal alternative to licensing Evolution's software and running it in parallel as the conversion was made is manual conversion. In order to perform such a manual conversion, Sun Trust Bank would have had to continue licensing Evolution's software until the changeover to their new software vendor, Hudson Valley Data Systems, was completed. Manual conversion of database files is a labor intensive task. Each loan file must be entered manually by date of transaction and checked for correctness prior commencing with validation testing. To perform this task, Sun Trust Bank would have had to extract data from Evolution's Data Dictionary Files so that they could put it in their Microsoft Access database. To simplify the conversion, they could have developed software utilities to create and test the files in question. Of course, their staff would have had to continue to check the

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conversion to ensure that the tools were working properly and the outputs conformed to legal constraints.

- To perform the database conversion manually, I assumed that it would have taken 20 minutes of labor to convert each customer loan record for use with the Hudson Valley Data System loan software. This conversion assumes that the associated Data Dictionary Files were used to define file structures and the interface mechanism with Hudson Valley Data System's Microsoft Access databases. Sun Trust Bank has reported in their annual State reports that they have 125,000 such records. The effort to perform this task can therefore be easily computed as follows:

$$\text{Cost} = 125\text{K records} * 20 \text{ minutes/record} * (1 \text{ hour}/60 \text{ minutes}) * \$90/\text{hour} = \$3,750,000$$

- Of course, this effort could have been reduced considerably if Sun Trust Bank would have hired Evolution to develop utilities to expedite performing the conversion automatically. This option assumes that Sun Trust Bank continued to pay their license fees for the year in which the conversion would have taken place. It also assumes that Evolution modified its file structures to accommodate an automated interface with Hudson Valley System's Microsoft Access databases. Assuming that such utilities were developed for about \$250,000, I estimated the reduced conversion effort in person-months (PM) and the associated cost, independent of license fees, as follows:

$$\text{Effort} = 125,000 \text{ files} * 1 \text{ minute/record} * (1 \text{ hour}/60 \text{ minutes}) = 2083 \text{ labor hours}$$

$$\text{Cost} = \$187,500 (\$90/\text{hour} * 2083.33 \text{ hours}) + \$250,000 = \$437,500$$

- The range in cost that Sun Trust Bank profited would have profited must be discounted over the one year that the conversion would have taken because payment would have probably been made for the support at the end of the conversion period. The present value of this range of profit gained by Sun Trust Bank again assuming that the minimum attractive Rate of Return was 3 percent is: \$424,769 to \$3,640,875.
- Selection of the proper valuation must be made by the attorneys representing Evolution to conform to State law.
- What seems fair to us is to take the average profit gained as follows and use this as our value for this unauthorized use:

$$\text{Profit gained} = (\$424,769 + \$3,640,875)/2 = \$2,032,822$$

5.2.4 UNAUTHORIZED USE OF DATA DOOR™ PRODUCT

- Item to Be Valued:** The unauthorized use of Data Door™ including PACFAC by Sun Trust Bank to create proprietary file structures to run with Sun Trust Bank's software and Evolution's proprietary databases.
- Standard of Value:** fair value
- Highest and Best Use Basis:** legal permissibility (lawful use)
- Estimated Useful Life:** 5 years (assumes obsolescence occurs at the end of this period). To determine useful life, I employed guidance provided by the Internal Revenue Service for valuing software items for tax purposes.

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- e. **Valuation Method:** income; the sum of the income lost in software development fees for the derivative product by the plaintiff and maintenance fees during the product's useful life (five year depreciable life).
- f. **Valuation Results:** \$252,635

Derivative Work Replacement Costs

Sun Trust Bank violated its license agreement when it used Evolution's Data Door™ product to define file and data structures. A software product was then developed by Sun Trust Bank and allegedly used illegally with these altered files and data structures. In this case, Sun Trust Bank had acquired a license to use the Data Door™ product and develop software that operated with the standard Data Dictionary Files (DDF) generated. It had the right to write software, but not to change the DDF and file definitions. The interface provided by Evolution for writing programs acts like a portal to the database, not a tailorable interface. However, Sun Trust Bank modified Evolution's Data Dictionary Files and used the modified files and data structure to run their software. Such use was specifically prohibited by Evolution's license agreement. For valuation purposes, the software that Sun Trust Bank developed represents the profit of the arrangement. It is therefore valued as a derivative work.

Evolution estimated that it would take one of their senior people one year to produce software with similar capabilities. They further stated that they had no plans to add these capabilities to their existing product because of lack of market demand. Although several clients had asked for this capability, none was willing to pay for its development. The replacement cost for this derivative work valued using Evolution's estimate is therefore computed as follows:

$$\text{Cost} = \text{One person} * 12 \text{ months/year} * 152 \text{ hours/month} * \$104/\text{hour} = \$189,696$$

To take into account the product's five year life, I assumed that Sun Trust Bank would have negotiated a maintenance agreement with Evolution until the end of the software's useful life. This is a generous assumption because Evolution, as an option, could have charged the Sun Trust Bank for maintenance on a time and materials basis. Assuming annual maintenance would cost 10 percent of the purchase price for this asset (i.e., this is an accepted industry rule of thumb), the resulting discounted cash flow is summarized in Table 3:

Item	Year					Totals
	1	2	3	4	5	
Development Income	\$189,696					\$189,696
Maintenance Income		\$18,970	\$18,970	\$18,970	\$18,970	\$75,880
TOTAL INCOME¹	\$189,696	\$18,970	\$18,970	\$18,970	\$18,970	\$265,576
PRESENT VALUE²	\$184,176	\$17,881	\$17,359	\$16,855	\$16,364	\$252,635

Table 3: Discounted Cash Flow for Derivative Work Replacement

Notes for Table 3

1. For simplicity in calculation, I assumed that the development income and maintenance fees would be paid as a lump sum at the end of each calendar year.
2. Assumed a 3% minimum attractive Rate of Return to compute present value of income stream.

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5.2.5 OPPORTUNITY COSTS

- a. **Item to Be Valued**: The business opportunities forgone during the litigation period because of violations by Sun Trust Bank.
- b. **Standard of Value**: fair value
- c. **Highest and Best Use Basis**: maximum profitability
- d. **Estimated Useful Life**: 2 years (during the time period associated with the litigation).
- e. **Valuation Method**: income
- f. **Valuation Results**: \$1,270,488

Lost Income

During the months that it took me to prepare this report, principals from Evolution worked almost full-time preparing materials for the case against Sun Trust Bank. Instead of focusing on acquiring new business, they used their time to meet with and provide inputs to the lawyers and to find relevant precedence to support their claims. If Sun Trust Bank had not violated their license agreements, much of this time could have and probably would have been spent generating new business. The new business lost is the opportunity cost (e.g., business opportunities forgone) that will be valued under this heading.

To estimate the impact on Evolution's bottom line, I assumed that one senior analyst will have worked half-time for two years (80 hours/month) to support the supporting the litigation until its conclusion. This somewhat conservative level of support seemed reasonable to me in light of the delays Evolution has experienced in trying to bring the case against Sun Trust Bank to court. I then assumed the analyst would generate, as a minimum, additional licenses for Evolution products valued at five times the effort expended (i.e., a rule of thumb that others in the industry use to evaluate the benefits of direct marketing campaigns). The resulting value that these lost opportunities is summarized in Table 4 as follows:

Item	Year 1	Year 2	Total
Analyst time (\$135/hour) ¹	129,600	136,080 ²	N/A
Income forgone (5X)	648,000	680,400	N/A
Present Value of lost opportunities ³	629,143	641,345	1,270,488

Table 4: Present Value of Opportunity Costs Viewed as Income Stream

Notes:

1. For simplicity in calculation, assumed that the license fees would be paid as a lump sum at the end of each calendar year.
2. Assumes that the analyst received a 5% salary increase in the second year
3. Assumes a 3% minimum attractive Rate of Return to compute present value of opportunity costs.

5.2.6 TOTAL VALUATION

The total value assigned to Sun Trust Bank's alleged unauthorized use of Evolution's products is summarized in Table 2 which is shown again for simplicity sake. This sum of \$4,001,627 represents what in our opinion represents a reasonable and equitable valuation.

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Step	Item Valued	Amount (\$)
2	Unauthorized use of PF32 TM software	445,682
3	Unauthorized use of Data Dictionary Files	2,032,822
4	Unauthorized use of Data Door TM	252,635
5	Opportunity costs	1,270,488
TOTAL VALUATION (in today's dollars)		\$4,001,627

Table 2: Total Valuation of Unauthorized Use of Evolution's Products

6. EXAMINATIONS UTILIZING THE COCOMO II MODEL

The COCOMO II software cost estimation model is the most heavily used set of mathematical formulas employed to predict the cost and schedule for software efforts. The formulas are based upon both expert opinion and actual data collected from 161 completed software projects. Such projects range in both size and complexity from simple Management Information Systems (MIS) to military command and control applications.

The COCOMO II software cost estimation model uses the following simple regression formula to predict the effort associated with developing software:

17	Effort = the estimated effort in person-months
	Size = the software size in logical source lines
$EFFORT = A (Size)^B \prod_{i=1}^{17} EM_i$	A = a constant
	B = the sum of five scale factors
	EM = the contribution of 17 cost drivers

Scale factors in COCOMO II relate to organizational conditions like how mature the processes are and whether or not teams are built and used as the norm. There are five scale factors that the model uses primarily to rate how well an organization can develop software systems. These five scale factors can have a relatively large impact on the effort estimate because their sum is used as an exponent to which size is raised. For example, the effort estimate for a 70,000 source line program could vary by as much as a factor of 3:1 dependent on how the scale factors were rated.

Cost drivers assess the relative impact of a variety of product, process, platform and personnel factors on effort and duration estimate. For example, the effort estimate in person-months would vary from 0.81 to 1.22 based upon applications experience (the staff assigned to the project experience doing similar applications with about the same complexity and size). In other words, the estimate would be increased by 22 percent if the average staff's application experience were less than 4 months. The effort would be reduced by 19 percent if the average staff experience with the application exceeded 12 years. The range for these parameters was determined by statistically analyzing data from 161 projects. Details of how these parameters and the model were calibrated are available at the University of Southern California's web site located on the Internet at <http://sunset.usc.edu/cocomoii>.

The five scale factors and seventeen cost drivers rated in the COCOMO II model include:

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Scale Factor	Brief Overview
PREC – Precedentedness	Has the system ever been built before?
FLEX – Flexibility	Must you strictly conform to requirements?
RESL – Risk and Architecture Resolution	Is the architecture is stable and risks have been mitigated?
TEAM – Teamwork	How complicated are the interactions?
PMAT – Process Maturity	How mature are the processes used?
Cost Drivers	Brief Overview
RELY – Required Reliability	How risky to human life and property?
DATA – Database Size	How big are the databases relatively?
CPLX – Complexity	How complex is the product to be built?
DOCU – Documentation	Is documentation right-sized to needs?
RUSE – Required Reuse	How much design for reuse?
TIME – Time Constraint	Is timing a constraint?
STOR – Storage Constraint	Is memory a constraint?
PVOL – Platform Volatility	How volatile is the development platform?
ACAP – Analyst Capability	How capable are the analysts?
PCAP – Programmer Capability	How capable are the programmers?
PCON – Personnel Continuity	How stable is the workforce?
AEXP – Application Experience	What’s the team’s application experience?
PEXP – Platform Experience	What’s the team’s platform experience?
LTEX – Language/Tool Experience	What’s the team’s language/tool experience?
TOOL – Use of Software Tools	How good are the tools used?
SITE – Multisite	Will multiple development facilities be used?
SCED – Required schedule	Will the schedule need to be constrained?

The ratings that I used for these parameters will be provided in Section 6.1, entitled “Analysis and Evidence Supporting My Opinions.” I ran the COCOMO model to determine the duration and effort needed for Sun Trust Bank to develop MIDAS software using parameter settings that reflect industry norms that were developed jointly with Evolution via teleconference.

The COCOMO Model and Productivity Statistics

Often, productivity statistics are difficult to compare because they include different work activities. Productivity statistics are inflated because they only include part of the job within their scope. The scope of the activities within the COCOMO II cost model is as follows:

Activity	Percent of Effort
Architectural Design (AD)	16
Component Design (PD)	18
Implementation (IM)	18
Integration & Test (I&T)	34
Project Management (PM)	8
Project Configuration Management (CM)	3
Project Quality Assurance (QA)	3

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These breakouts compare nicely with those contained in the textbook describing the model¹. The task of software development starts with requirements*. The package is then architected (*i.e.*, the components of the software package are defined along with their interfaces with each other, the operating system and the databases) to satisfy the requirements and work in the intended operational environment. Then, each of the components is designed to perform functions or services/operations specified. When the detailed design is completed and peer reviewed, components are coded using a programming language like Visual Basic or C++ and debugged. Then, they are integrated together into working systems and tested incrementally to ensure they function as expected. Finally, documentation is prepared and products are subjected to beta testing before they are released to market.

* It is important to note that the COCOMO package does not estimate the effort associated with developing requirements. If such effort is applicable, it must be added to the estimate. This is done by the models using heuristics.

It is also important to note *that coding and debugging a module is but a small part of the software effort (i.e., less than 20 percent).*

¹ Barry W. Boehm, Chris Abts, A. Winsor Brown, Sunita Chulani, Bradford K. Clark, Ellis Horowitz, Ray Madachy, Donald Reifer and Bert Steece, *Software Cost Estimation with COCOMO II*, Prentice-Hall, 2000.

6.1 ANALYSIS AND EVIDENCE SUPPORTING MY OPINIONS

6.1.1 UNAUTHORIZED USE OF PF32™ SOFTWARE

To assess how much effort it would have taken Evolution to develop the unauthorized report for Sun Trust Bank assuming a time and materials contract were provided, I developed a nominal estimate for the MIDAS software assuming that the software size was 9,972 source lines of Visual Basic code. As already noted, I rated the factors/drivers in the COCOMO model with Evolution via a teleconference. I debated ratings with them until I believe that the ratings assigned to the parameters were reasonable. These ratings are summarized below.

Scale Factor	Nominal Case	Cost Driver	Nominal Case
PREC	Largely Familiar	RELY	H – high financial losses
FLEX	Rigorous	DATA	N – not large
RESL	Generally (75%)	CPLX	L – straightforward
TEAM	Basically Cooperative	DOCU	L – some needs uncovered
PMAT	SEI CMM Level 1 Lower	RUSE	N – across project
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p>The COCOMO II model uses 5 scale factors and seventeen cost drivers to adjust estimate based on process, product, personnel and project factors</p> </div>	TIME		N – not optimized
	STOR		N – not optimized
	PVOL		L – not volatile
	ACAP		H – 75 th percentile
	PCAP		H – 75 th percentile
	PCON		VH – 3% annually
	AEXP		VH – 6 years
	PEXP		VH – 6 years
	LTEX		VH – 6 years
	TOOL		VL – edit, code & debug
	SITE		N – multi-city, multi-firm
	SCED		N – optimum

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As part of running the model, I performed the following added tasks:

1. Examined all of the documents and exhibits I acquired and was provided.
2. Provided Evolution with guidance on properly counting source lines of code (SLOC).
3. Examined SLOC size estimates provided to me by Evolution to make sure that they were reasonable.
4. Ran the COCOMO software package using the ratings developed with input by Evolution.
5. Cross-checked the results against published benchmarks to ensure that the estimates generated were reasonable.

The estimate generated by the model assuming that the requirements effort was added was as follows:

	Effort	Cost (\$)
Effort (PM)	11.1	182,218
Effort with RQ (PM)	11.8	193,709
Duration (months)	9.4	N/A

Notes:

- All dollars are current year (\$2002)
- Cost/Person-Month (PM) of effort was assumed to be \$16,416 [(0.6 (\$90/hour) + 0.4 (\$135/hour)] for 152 hours/PM)

7. CONCLUSIONS

The findings and opinions set forth in this report are based on my work and examinations to date. I may continue my examinations. I may also receive additional documentation and other factual evidence over the course of the litigation that will allow me to alter, supplement and/or refine my opinions. I reserve the right to add, alter, or delete portions of my report upon discovery of any additional relevant information.

I declare under penalty of perjury that the foregoing is true and correct based upon the materials furnished to me.



Donald J. Reifer, Valuation Analyst
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6/26/03

Date

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ACRONYMS

AIAA	American Institute of Aeronautics and Astronautics
COCOMO	Constructive Cost Model
CSE	Center for Software Engineering (University of Southern California)
DBMS	Data Base Management System
DDF	Data Dictionary File
DISA	Defense Information Systems Agency
DOD	Department of Defense
IBM	International Business Machines
IEEE	Institute of Electrical and Electronics Engineers
I/O	Input/Output
IP	Intellectual Property
IRS	Internal Revenue Service
IT	Information Technology
MIS	Management Information System
NASA	National Aeronautical and Space Administration
NPV	Net Present Value
R&D	Research & Development
RCI	Reifer Consultants, Inc.
ROI	Return on Investment
SEE	Software Engineering Environment
SLOC	Source Line of Code
USA	United State of America
USC	University of Southern California

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EXHIBIT A – EXPERT’S VITAE

CONTACT INFORMATION:

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CURRENT POSITION:

- President and Chief Technical Officer - Reifer Consultants, Inc.

CAREER SUMMARY:

- Internationally recognized leader in the fields of software engineering and management.
- Consultant who helped firms to implement metrics-based software management concepts.
- Professional with over twenty years of experience in software cost estimating, benchmark development and productivity analyses.
- Entrepreneur who built a software firm from scratch into a respected firm in the industry.
- Senior Executive Official with the Department of Defense in charge of managing major Service and Agency-wide information management and software technology initiatives.
- Consultant who helped clients to introduce new technology and facilitate change (Alcatel in Europe, Hitachi in Japan, Northrop in the USA, etc.).
- Senior Manager responsible for multi-million dollar satellite contracts while with TRW and for pulling together the Department of Defense's efforts on the Space Shuttle project while with The Aerospace Corporation.
- Lead software engineer responsible for automating factories, managing research and developing real-time software for weapons systems while with Hughes Aircraft Company.
- Author, lecturer and currently visiting associate at the Center for Software Engineering at the University of Southern California.

EMPLOYMENT HISTORY:

President and Chief Technical Officer for Reifer Consultants, Inc. (1995 to Present).

As a proven senior software executive, Mr. Reifer is frequently called on to help clients to startup (and recover) large software intensive projects. He helps insert a philosophy of metrics-based management to help program managers gain insight into their issues, risks, productivity and rate of progress. In this capacity, he works with clients to tap the potential of the new technology by tying business goals to technical solutions using econometric models devised for that purpose. He also leads our R&D efforts that are developing anti-tampering technology and software reengineering. Mr. Reifer teaches the topics of software project management and software economics internationally. As one of the recognized leaders in this field, he is often asked to keynote conferences and symposia. He is also asked to participate on government panels and studies (Air Force Scientific Advisory Board, etc.).

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Senior Executive Official, Department of Defense (1993 to 1995).

Mr. Reifer led a number of the nation's premier information technology and software initiatives under an Intergovernmental Personnel Act assignment with the Defense Information Systems Agency. He provided vision and technical leadership for the Ada, reuse and several other information technology improvement efforts. He was responsible for a budget exceeding \$100 million and a staff of about 100 professionals. He served on various governmental boards and led inter-Agency teams and task forces looking to improve how software was managed. During his tenure as Chief of DOD's Software Initiatives Office, Mr. Reifer refocused the software reuse initiative on product lines, revitalized the Ada program and directed the Intelligent SEE effort. Using partnerships and innovative dual-use approaches, he influenced many other DOD projects.

President and Chief Technical Officer for Reifer Consultants, Inc. (1979 to 1993).

Mr. Reifer grew this consulting firm to become one of the leaders in the field of software improvement and change management. He championed the concept of "metrics for management." The firm at its peak employed more than 30 software professionals engaged in software product development in its California and Maryland offices. Besides managing a growing firm with a revenue exceeding \$3 million annually, Mr. Reifer worked engagements where he helped several Fortune 500 firms to put new technology into practice operationally. As a trusted advisor to senior executives, he helped develop strategies aimed at improving how they managed information technology within their firms. These involved maturing the software process, professionalizing the workforce and standardizing the products. As a leader in the field, he also served on review boards, panels and graybeard teams during this period.

Samples of the projects commissioned by his clients during include: software architecture studies (Alcatel and Hitachi), benchmarking studies (Honeywell, and Westinghouse), independent test support (Ashton-Tate and Tektronix), independent estimate development (Magnavox, NASA and Northrop Grumman) policy development (Jet Propulsion Lab and Raytheon), process improvement support (Texas Instruments and Westinghouse), product assessments (Digital Equipment Corp. and IBM), project management support (Galileo probe, Space Station, and Teal Ruby satellite), software planning and risk management support (NASA and Schlumberger), software tool studies (Computer Science Corp. and Planning Research Corp.), strategy development (General Telephone & Electric, Intel, Rational Software, and Thomson) and research and development planning (AT&T, MITI in Japan, the Navy and Shell Oil).

Deputy Program Manager at TRW (1978 to 1979).

Mr. Reifer served as principal engineer in the Digital Avionics Laboratory in the areas of software verification and validation, logistics support of embedded computer systems and software research. He served as the Deputy Program Manager for TRW's Global Positioning System efforts and acted as the project's Chief Engineer. He also served as Deputy Program Manager for a large Air Force study that developed a management support concept to be used command-wide for post deployment support. He was the principal engineer in TRW's independent review of the Wild Weasel avionics and contributed to the design of a number of Avionics Integrated Support Facilities at Warner Robins and Sacramento Air Logistics Centers. He devised an integrated avionics technology program for the Minuteman Program Office and led research efforts across divisions in fail-safe avionics systems.

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Software Manager at The Aerospace Corporation (1974 to 1978).

Mr. Reifer managed all of the software activities for The Aerospace Corporation's Space Transportation System (Space Shuttle) Program Office. His responsibilities included providing general systems engineering support to the U. S. Air Force and technical direction to the eleven prime contractors tasked with producing over 20 million operational instructions for the various Space Shuttle on-board and ground systems. He supervised an engineering staff of twenty plus professionals who was tasked with managing multiple contractor teams who were developing real-time software for launch vehicle, mission operations and planning, uplink, downlink, checkout and command and control applications.

Lead Software Engineer at Hughes Aircraft Company (1969 to 1974).

Mr. Reifer worked on the F-111 Phoenix, F-15 Radar and several other avionics projects first as a programmer, then as a lead engineer and finally as a subproject manager. He served as software advisor to El Segundo Manufacturing Division management in the area of real-time control systems and automation. His responsibilities were to devise their master plan and to provide technical support to their efforts that were aimed at automating the manufacture of complex military electronic and satellite systems. He led software research efforts and built a highly successful distributed air defense systems simulation capability that was used to conduct performance analysis studies.

Other Positions.

Mr. Reifer worked for E.I. du Pont de Nemours as summer hire in 1968 and spent four years in the U. S. Air Force as a cryptographic equipment repairperson.

EDUCATION:

- Certificate in Business Management, University of California at Los Angeles, 1974.
- M. S. in Operations Research, University of Southern California, 1971.
- B. S. in Electrical Engineering, New Jersey Institute of Technology, 1969.

PROFESSIONAL ACTIVITIES:

- Editor, Software Management Column, IEEE Software Magazine
- Advisory Editor, Journal of Systems and Software (JSS)
- Member of the Association for Computing Machinery (ACM) and National Lecturer
- Senior Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Life Member of the International Society of Parametric Analysts (ISPA)
- Member of the International Function Point User's Group (IFPUG)

AWARDS AND HONORS

- AIAA Software Engineering Award, 2002
- Secretary of Defense's Medal for Outstanding Public Service, 1996
- Defense Information Systems Agency Outstanding Service Award, 1995
- Defense Mapping Agency Outstanding Service Award, 1995.
- International Federation of Parametric Analysts Freiman Award, 1991
- Who's Who in the West, 1978
- Hughes Aircraft Company Masters Fellowship, 1969
- Eta Kappa Nu (Electrical Engineering Honors Society), 1969
- Omicron Delta Kappa (National Leadership Honors Society), 1969.

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SPECIAL QUALIFICATIONS

Mr. Reifer is currently serving as a visiting associate with the Center for Software Engineering at the University of Southern California. He is helping to shape the research being done by graduate students in the areas of software architectures, network security, cost estimating and risk management. He also leads research into new estimation and measurement paradigms for systems engineering and extreme programming.

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EXHIBIT B – GLOSSARY OF TERMS

Asset	Refers to something of value that the firm owns and can capitalize [1].
Benchmark	A standard against which measurements or comparisons can be made.
Best practice	An engineering or management activity that directly addresses the purpose of a particular process and contributes to the creation of its output [1].
Costing	In management, the process of developing a cost estimate for an item, task, or activity. Costing and pricing are separate but related activities typically done by different people at different times during the software life cycle [1].
Cost/benefit analysis	Analysis performed to compute the net benefits (i.e., can be plus or minus) resulting from an investment decision [1].
Depreciation	A systematic system of accounting which aims to distribute the cost or other basic value of tangible assets, less salvage value (if any), over its estimated useful life [1].
Development time	The time required to a task from its planned start to finish expressed in calendar months [1].
Discounted cash flows	A method for expressing a projected stream of cash flows as a present worth [1].
Economic profits	Difference between total revenue and total opportunity costs [1].
Economies of scale	The lowering of costs based by spreading fixed costs over a large volume [1].
Estimate	The most knowledgeable forecast available of what the resources needed in the future to complete the task [1].
Expected value	The weighted average using probabilities as weights [1].
Fair market value	The price at which an asset would change hands between a willing buyer and a willing seller, neither being under compulsion to act and both having reasonable knowledge of all relevant facts (Internal Revenue Service).
Feasibility analysis	A study of the cost-benefit relationship of an economic endeavor [2].
Future worth	The cash value of a decision measured using some “future date” as the common point of reference [1].
Intangible property	Non-physical assets, including but not limited to franchises, trademarks, patents, copyrights, goodwill, equities, mineral rights, securities, and contracts, as distinguished from physical assets such as facilities and equipment [2].
Intellectual property	The intangible output of the rational thought process that has some intellectual or informational value.
Interest	The money charged for use of borrowed assets [1].

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Least square method	Statistical method in regression analysis aimed at finding the regression line with the best fit to the actual data [1]
Market value	A type of value, stated as an opinion, that presumes the transfer of property, as of a certain date, under specific conditions set forth in the definition of the term as applicable in an appraisal [2].
Minimum attractive rate of return	The minimum Rate of Return that is attractive to investors (i.e., interest rate cash could earn if the funds were put in a bank account) [1].
Model	A representation of a real-world process, device or concept [1].
Opportunity costs	Net benefits forgone when pursuing an alternate use of resources [1].
Optimum price	Typically the price at which profit is maximized [1].
Payback period	The amount of time required to recover the costs of the initial investment [1].
Pareto analysis	An analysis based upon the premise that most effects are generated from relatively few causes (e.g., the 80/20 rule) [1]
Present value	The cash value of a decision measured using the “present date” as the common point of reference [1]
Price	The amount asked, offered, or paid for property [2].
Pricing	In management, the process of determining how much to charge a customer or user for products and services. Costing and pricing are separate activities. Organizations can price services for less than their cost and still make a profit based upon the economies of scale [1].
Process	A sequence of steps performed for a given purpose, for example, the software development process [1].
Process maturity	A relative assessment of an organization’s ability to achieve its goals through the technical and managerial processes it uses to develop its products and services [1].
Rate of return	The interest rate at which the present worth of receipts resulting from the project is equal to the present worth of the disbursements [1].
Real option theory	An approach to value assets that assumes a dynamic series of decisions exists where management has the flexibility to adapt given changes to the business environment [3].
Return on investment	A measure of how much profit an investment earns computed by dividing net income by the assets used to generate it [1]
Salvage value	The amount realized, by sale or other dispositions, when the asset is retired from service [1].
Schedule	The actual calendar time budgeted for accomplishing the goals established for activities or tasks [1].

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Scheduling	In management, the process of allocating and interrelating tasks to the schedule. This activity is like figuring out a jigsaw puzzle, especially when many of the tasks must be done in parallel [1].
Sensitivity analysis	Analysis conducted to determine to which of the input parameters the solution is sensitive [1].
Software license	A revocable right to use software in specified places, or specified platforms, and in specified ways [1]
Software life cycle	The period of time that begins when a software product is conceived and ends when the software product is no longer available for use [1]
Staff	Persons assigned to an organization to do the work [1]
Staffing	Management activities conducted to acquire, develop and retain staff resources within an organization [1].
Standard deviation	A measure of uncertainty computed as the square root of the mean of the squared deviations from the expected value [1]
Sunk cost	An expense that has occurred before an investment decision is made [1]
Time value of assets	The changing value of assets from one time period to another [1]
Trend analysis	A statistical procedure used for estimating the mathematical relationship between the dependent variable (e.g., sales) and time [1]
Uncertainty	In management, the degree of entropy associated with the information used to make a decision [1]
Useful life	The period over which an asset can be reasonably used in trade or business. The Internal Revenue Service has established the minimum lives that may be used along with methods for depreciation for computing depreciation for various classes of assets [1].
Value	The monetary relationship between properties and those who buy, sell, or use those properties [2].
Valuation services	Services pertaining to aspects of property value [2].

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